

# Climate Change and the Cultural Environment

Recognized Impacts and Challenges in Finland

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MINISTRY OF THE ENVIRONMENT



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## PREFACE

Climate change became a subject of broad discussion in the 2000s. The debate on future changes in climate, measures for mitigating climate change, and opportunities for adaptation continues in various sectors. The connections between climate change and the cultural environment have also led to interest at the national, Nordic and international levels.

In late 2007, the joint Nordic project *Effekter av klimaendringer på kulturminner og kulturmiljø* (*The Effects of Climate Change on Heritage Sites and the Cultural Environment*) was launched for the purpose of gathering and disseminating information on how climate change is expected to affect the Nordic countries, in particular, the specific impacts of climate change on the cultural environment and its care and administration. This report is part of the project and was prepared with funding for international activities from the Ministry of the Environment of Finland.

The report has been prepared by Jonna Berghäll, Planning Officer, Natural Heritage Services of Metsähallitus (formerly National Board of Forestry), and Minna Pesu, Researcher, Department of Monuments and Sites of the National Board of Antiquities. The work was steered by a project group consisting of Senior Planning Officer Anu Vauramo of Metsähallitus, Curator Margaretha Ehrström of the National Board of Antiquities, and Senior Architect Minna Perähuhta of the Ministry of the Environment. While under preparation, the work received comments from, among others, environmental administration bodies and museums (see Appendix 1: Experts interviewed in the spring of 2008 for the Climate Change and the Cultural Environment report, and Appendix 2: Expert bodies from which comments were requested for the Climate Change and the Cultural Environment Report in September 2008).

This report charts the most important currently recognized threats from climate change to the cultural environment and opportunities provided by it in Finland and more broadly in the Boreal Zone of Northern Europe. The report also discusses what information is still needed and presents themes for further study.

Director General,  
Department for the Built Environment

Helena Säteri



## CONTENT

<b>Preface</b> .....	3
<b>Concepts</b> .....	6
<b>I Introduction</b> .....	7
<b>2 Climate change – mitigation and adaptation in Finland</b> .....	10
2.1 Predicted effects of climate change in Finland.....	10
2.2 National energy and climate policies .....	12
2.3 National adaptation policy .....	12
<b>3 The impact of climate change on the cultural environment</b> .....	13
3.1 Cultural landscapes .....	13
3.1.1 Changes in temperature and humidity .....	13
3.1.2 Increased occurrences of extreme weather phenomena and adaptation to them .....	15
3.1.3 Measures for mitigating climate change .....	15
3.2 The built cultural environment .....	15
3.2.1 Changes in temperature and humidity conditions .....	16
3.2.2 Increased occurrence of extreme weather phenomena and related adaptation .....	17
3.2.3 Measures for mitigating climate change .....	20
3.3 Archaeological heritage .....	21
3.3.1 Changes in temperature and humidity conditions .....	21
3.3.2 Increased occurrence of extreme weather phenomena and related adaptation .....	22
3.3.3 Measures for mitigating climate change .....	22
<b>4 Challenges to administration and proposals for measures</b> .....	23
<b>5 Monitoring of the Climate Change and Cultural Environment Project</b> .....	26
<b>Sources</b> .....	27
<b>Appendices</b> .....	29
Appendix 1. Experts interviewed in the spring of 2008 for the Climate Change and the Cultural Environment report.....	29
Appendix 2. Expert bodies from which comments were requested in September 2008 for the Climate Change and the Cultural Environment Report .....	30
Appendix 3. International agreements in the field of the cultural heritage to which Finland is a signatory .....	31
<b>Documentation page</b> .....	32
<b>Kuvailulehti</b> .....	33
<b>Presentationsblad</b> .....	34

## Concepts

### Climate change

Climate change means any chronological change in the climate that can be the consequence of natural factors and human activity alike (Karttunen et al. 2008). This term often refers to global warming of the climate exceeding natural variation and resulting directly or indirectly from human activity (United Nations 1992).

### Mitigating climate change

Climate change mitigation means human activities that reduce greenhouse gas emissions or that increase the number of sinks of greenhouse gases (Ministry of Agriculture and Forestry 2005).

### Adaptation to Climate Change

Adaptation to climate change is understood as the adaptation of man and nature to changes in climate that are either anticipated or that have already occurred by making use of their benefits or minimizing adverse effects. Adaptation can be anticipatory, voluntary, planned or reactive (Ministry of Agriculture and Forestry 2005).

### The cultural environment

'Cultural environment' is a general term for an environment with traits manifesting the various stages of culture and the interaction between man and nature. The cultural environment also encompasses man's relationship with his environment in the past and present, involving its varied meanings, interpretations and naming. The cultural environment comprises cultural landscapes, the built cultural environment, traditional rural biotopes and the archaeological heritage (Ministry of the Environment & the National Board of Antiquities 2006).

### The built cultural environment

The built cultural environment – that is, the architectural heritage – is an entity consisting of the urban structure, buildings with their exteriors and interiors, yard areas and parks, infrastructure (e.g. streets, roads, bridges, canals), and other man-made works in the environment (Ministry of the Environment & the National Board of Antiquities 2006). The concept refers to the environment built in concrete terms, the history of land use and building, and how it has come about.

### The cultural landscape

Cultural landscapes are created through the joint impact of man and nature. Distinct types of cultural landscapes are the rural cultural landscape shaped through the long-term interaction between man and nature and, as an extreme case, the urban landscape created almost uniquely by human effort (Ministry of the Environment & the National Board of Antiquities 2006).

### Traditional rural biotopes

Traditional rural biotopes are created through the effects of traditional cattle raising, cutting hay and grasses, and grazing. They are classed as open and wooded traditional rural biotopes. Most of the open traditional rural biotopes are various kinds of meadows, classified according to vegetation, the humidity of growth sites, contour, nutrient content and the limestone content of the soil. Wooded traditional rural biotopes include forest meadows, pastures and meadows with deciduous trees (Ministry of the Environment & the National Board of Antiquities 2006).

### Archaeological heritage

The archaeological heritage consists of structures and layers preserved in the landscape or the soil deriving from the activities of people who have lived at the site. They include burial cairns, offering stones, ancient hillforts, stone labyrinths and fortifications (Ministry of the Environment & the National Board of Antiquities 2006). In addition, immovable archaeological heritage under the surface of the ground, such as inhumation graves, and the underwater archaeological heritage are antiquities as defined in the Antiquities Act (295/63). The underwater archaeological heritage consists of the wrecks, or parts thereof, of ships or other vessels that can be assumed to have sunk over a hundred years ago, and man-made underwater structures related to past settlement and history.

# 1 Introduction

Climate change, or the warming of the climate, is indicated by observations of changes in the temperature of the air and the sea, the melting of snow and ice and the rise of sea levels (IPCC 2007). The greenhouse gas content of the atmosphere is higher than ever before and is continuing to rise. Carbon dioxide is one of the most important greenhouse gases and calculations of carbon balance can be used in determining stores, sinks and emissions of carbon. Even if the rise in carbon dioxide emissions could be halted, carbon content in the atmosphere would continue to grow. Eleven of the preceding twelve years (1995–2006) are among the twelve warmest years on earth since 1850, when measurements of temperature first became available. Depending on the scenario,

mean global temperature is expected to rise by 1.1°C to 6.4°C by the end of the century.

On the global scale, climate change has different impacts in different regions on the production of foodstuffs and the availability of water, among other aspects. The temperature of the northern land regions will rise considerably and precipitation will also increase in the northern latitudes. Although the total amount of rainfall will increase, long dry periods may occur more often between rainy weather. Tropical and subtropical regions, in turn, will be threatened by drought and reduced crop production as a result. Climate change will have major effects on the polar regions, especially the melting of glaciers (IPCC 2007, Barr 2008).

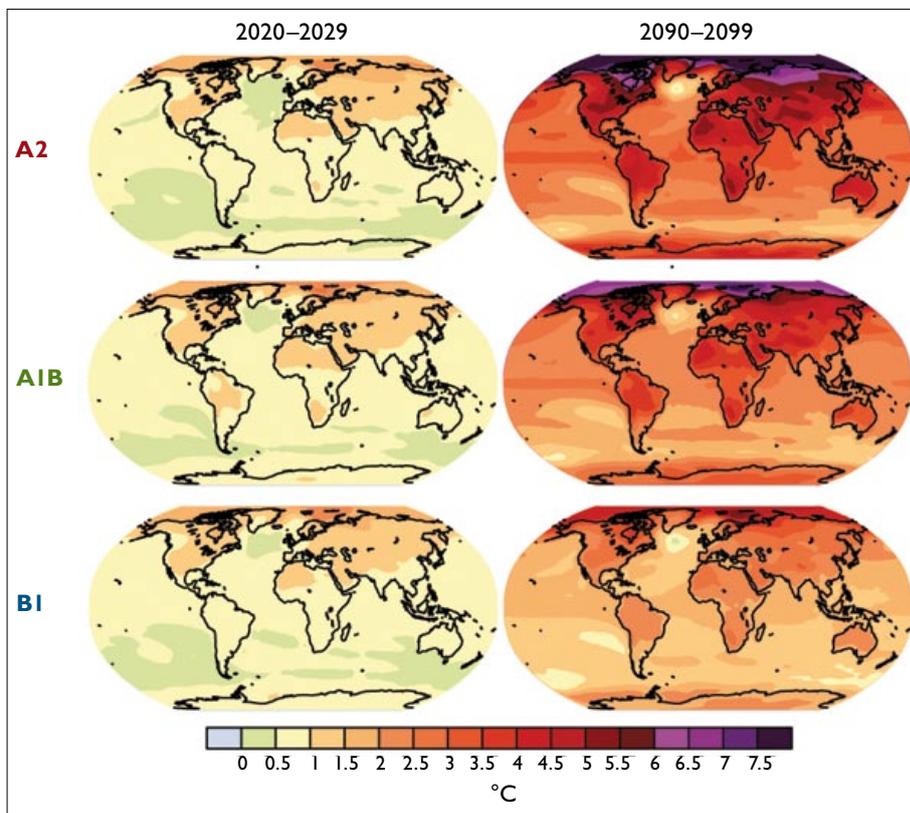


Figure 1. Predicted global changes in temperature in the 21st century compared with the period 1980–1999 using different SRES scenarios. Scenario A2 presents a highly heterogeneous globe with high population growth, poor economic growth and poor development of technology. Scenario A1B depicts a situation of rapid economic growth, population growth declining in the mid-21st century and technological evolution. Scenario BI is similar to A1B but with economic structures developing rapidly towards a service-oriented and information society (source: IPCC 2007).

In addition to researchers, citizens have also become increasingly convinced that human activity is causing the climate to change. In a Finnish survey concerning meteorological information, 90 % of the respondents believed that human activity is causing climate change and 60 % believed that the climate had already changed (Kankaanpää, Carter & Liski 2005). Climate change in Finland is expected to result in a rise in the mean temperature, increased precipitation (especially in winter) and effects on the strength and/or rate of occurrence of extreme climatic phenomena (Ministry of Agriculture and Forestry 2005). The effects of climate change, both positive and negative, will apply in different ways to various sectors.

### Climate change mitigation and related adaptation

Objectives, agendas and action related to climate change are broadly divided into measures mitigating change and promoting adaptation to it. International agreements and commitments largely guide Finland's climate and energy policies and strategies for mitigating climate change, the most of important of which is the national strategy to implement the Kyoto Protocol (Ministry of Trade and Industry 2005). This strategy has brought about adaptation strategies specific to sectors of administration. The term *national adaptation strategy* is used hereinafter for the strategy for adaptation to climate change at the national level.

### The cultural environment and climate change

The cultural environment is an environment reflecting the interaction between man and nature. It is an integral part of human culture and the identity of people. The preservation and maintenance of the specific characteristics of the cultural environment are steered through legislation on building and land use. Finland has agreed to protect and maintain its cultural heritage by ratifying international conventions. The cultural environment is also an important factor in tourism, for example, attracting tourists at the local, national and international levels.

International organizations such as UNESCO (United Nations Educational, Scientific and Cultural

Organization) have noted the possible impacts of climate change on the cultural and natural heritage. By ratifying the UNESCO convention concerning the protection of the world's cultural and natural heritage, Finland has agreed to attend to the preservation of its nationally significant cultural and natural heritage for future generations. In addition, agreements approved by the Council of Europe, and ratified by Finland, place Finland under the obligation to maintain and care for its cultural heritage (see Appendix 3). The Council of Europe has three central conventions on the cultural heritage, specifically concerning the protection of the architectural heritage (Granada Convention of 1985), the protection of the archaeological heritage (Malta Convention of 1992) and the protection of the landscape (Florence Convention of 2000).

UNESCO has noted that while climate change may pose a threat to the preservation of the cultural and natural heritage, there is not yet sufficient information on the impacts of climate change on the cultural environment (UNESCO 2008). An interdisciplinary expert body has been established upon the initiative of the director-general of UNESCO to monitor issues related to climate change in all sectors of UNESCO's work. In a survey concerning UNESCO's World Heritage sites, 72 % of the consulted persons in charge of these sites noted that climate change has an impact on the natural and cultural heritage. Although the majority of the World Heritage sites for which climate change is believed to cause immediate problems are natural or natural and cultural sites, climate change is also regarded as a challenge for the preservation of many ancient monuments, churches, fortresses and castles (UNESCO 2007a).

The cultural environment has strong connections with the climate – livelihoods shaping the landscape are based on species thriving in the prevailing climate, and towns and communities have been planned and built according to the predominant local climate. The connection between climate and the cultural environment may encounter problems not only because of purely climatic factors and meteorological phenomena, but also because of mitigation measures of a climate and energy-political nature and the adaptation measures that are needed especially in settled areas to preserve living conditions (UNESCO 2007b).

## Content of the report

This report discusses in the light of presently available information and existing agendas and reports the threats and opportunities caused by climate change that concern the cultural environment of Finland. It considers both the immediate effects of climate and meteorological phenomena and the impact of mitigation and adaptation policies. It is to be noted that not all effects can be evaluated comprehensively with the existing information.

The chronological scope of the report varies. Extreme weather phenomena such as floods and storms are already possibly (either because of climate change or regardless of it), as are also mild winters without snow with temperature variations just around freezing. On the other hand, changes in biodiversity and pest species may take place over a longer period. The effects of climate change on temperature and precipitation have mostly been forecast up to the end of the century, and the period considered in this report is delimited accordingly. Over the short term, the cultural environment may be affected less by climate change as such than by mitigation and adaptation measures, such as the construction of wind-power facilities, various solutions for energy efficiency and preparations for extreme weather phenomena.

The national climate and adaptation strategies are the main points of departure of the present report. These strategies, however, do not consider the cultural environment directly; thus, it is taken under consideration partly in an indirect manner via other sectors. This report draws on international literature discussing threats to the cultural heritage (e.g. UNESCO 2007a & 2007b; English Heritage 2006). In addition, the report relies on international projects that have produced information on the subject (e.g. the European Commission project *Noah's Ark – Global Climate Change Impact on Built Heritage and Cultural Landscapes*<sup>1</sup>). The present report is mainly based on the views of interviewed experts. See Appendix 1: List of experts interviewed in the spring of 2008.

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<sup>1</sup> On the Noah's Ark project, <see <http://noahsark.isac.cnr.it>>.





















































